



Aquaculture Gear Management Techniques

NC DEPARTMENT OF ENVIRONMENTAL QUALITY

Jacob Boyd | NC Division of Marine Fisheries

NC Aquaculture Gear Management and Storm Preparedness Workshop

Apr. 8, 2021



Aquaculture Gear Management Techniques

Overview

- Derelict gear
- Public perception
- Permanent Gear Tags
- Best Management Practices (BMPs)
- Key Takeaways - NC Aquaculture Development Conference 2021

Aquaculture Gear Management Techniques

Derelict Gear

❖ Issues

- Hazards to wildlife and navigation
- Contributes to negative public perception
- Reduces profitability

❖ Causes

- Storm events
- Improper gear maintenance/farm management

❖ Solutions

- Tracking mechanisms (i.e., permanent gear tags)
- BMPs

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Public Perception



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Permanent Gear Tags



Benefits

- Able to identify gear after storms for retrieval
- Tracking mechanisms
- Theft
- Minimal cost



Products for Marking & Identifying Shellfish Aquaculture Lines & Gear

Flag Markers
Flag markers are available in 3 flag sizes: 1-5/8" x 1", 1-7/8" x 1-1/8", and 2" x 3" and lengths of 3', 6', 9" and 18". They are available in 5 UV resistant colors for easy identification and may be hot stamped with company names, phone numbers or serial numbers. These are rated for 120 lb. tensile strength.

Weather Resistant Zip Ties
Zip Ties are UV weather resistant and offer easy, fast and economical installation for gear, color coding or to seal bags. Sizes range from 4"-60" in length and are 18 lb. to 250 lb. tensile strength.

Stainless Steel Cable Ties
Stainless Steel cable ties endure extreme temperatures and severe environmental conditions. They are available in 200 and 350 lb. tensile strengths as well as sizes from 5" to 60".

Multi-Purpose Cable Ties
Multi-purpose cable ties are available in 18, 40, 50, 120 and 175 lb. tensile strengths, as well as a wide range of lengths. They are also available in a wide range of colors for marking and identification purposes.

Custom Services
For custom identification, we offer high quality hot stamping on all nylon cable ties, including the Flag Markers.

Call today to request a copy of this ad to receive a discount.

For more information, visit our website at nelcoproducts.com, 800-346-3526 x136

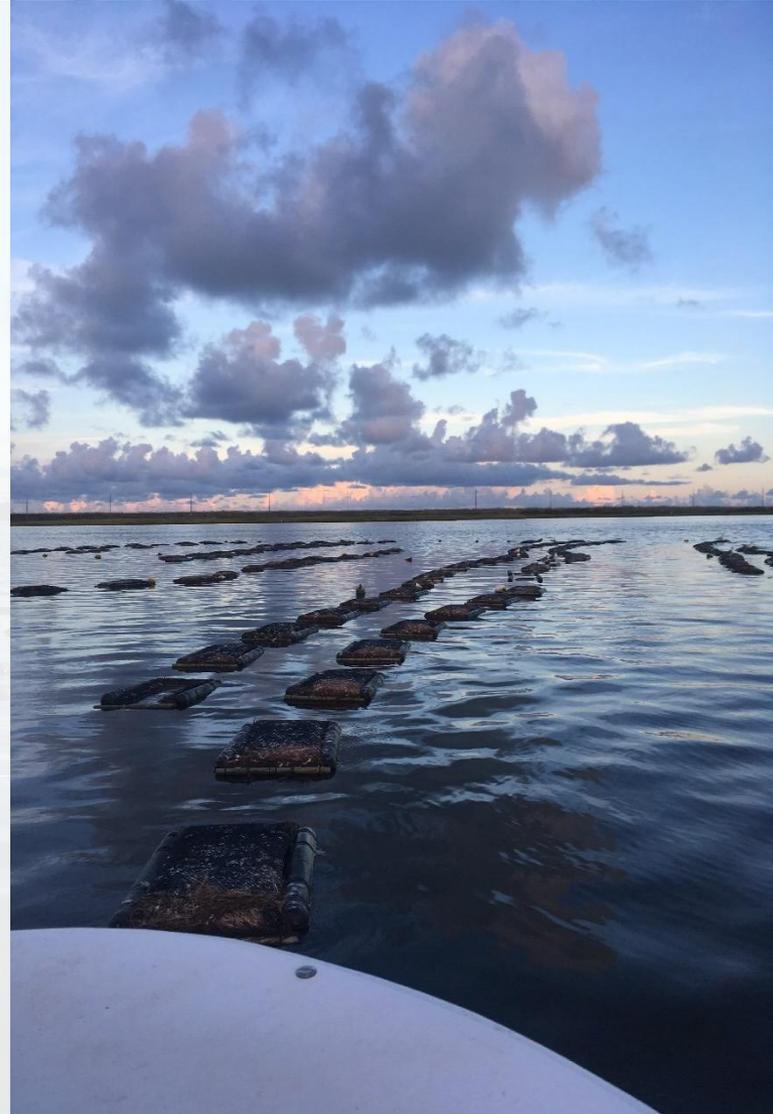


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Best Management Practices (BMPs)

❖ Help Avoid Issues

- Set guidelines for siting, design, and operations
- Storm preparedness plans
- Focused around:
 - Operational/maintenance issues
 - User conflicts
 - Permitting and siting
 - Environmental Concerns



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Best Management Practices (BMPs)

❖ Help Avoid Issues

- Siting errors leading to damaged and lost gear
- Broken lines, anchors, and attachment points from wear & tear
- Gear choices leading to excessive waste
- Avoidable storm damage
- **All of these improve public perception!**



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Best Management Practices (BMPs)

❖ Templates

- FL Dept. of Agriculture and Consumer Services
- NC Coastal Federation/NOAA/Sea Grant
- Gulf States
- East Coast Shellfish Growers Association

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Shellfish Aquaculture

GEAR MANAGEMENT

FDACS-01914 Technical Bulletin #10 - January 2019

Overview:
 Assess Industry Needs
 Lease Stewardship and Public Perception
 Best Management Practices for Shellfish Gear
 Pollution, Beach Recovery and Recycling
 Shellfish Gear Management Strategies
 Preparing for Severe Weather
 Regional Resource

Sequestering the public and supporting Florida's agricultural economy

Impacts of Marine Debris

Lease Stewardship and Public Perception

Prevention of Marine Debris from Shellfish Mariculture

Florida Department of Agriculture and Consumer Services

PREVENTION OF MARINE DEBRIS FROM SHELLFISH MARICULTURE

BEST MANAGEMENT PRACTICES FOR NORTH CAROLINA PRODUCERS

Sea Grant
 Florida - Louisiana
 University of Florida
 1000
 1000

Oyster AQUACULTURE

Tropical Storm and Hurricane Preparedness for Off-bottom Oyster Aquaculture in the Gulf of Mexico
 Introductory Planning Guide

Leslie Starnes
 Bill Walker
 Erik Lovstrand
 Natalie Simon
 Rully Grice
 Brian Callum

INTRODUCTION

Oyster aquaculture is relatively new in the Gulf of Mexico region. Since 2000, over 100 farms have become established in Alabama, Florida, Louisiana, and Mississippi. Oyster aquaculture, like any agricultural operation, has inherent risks with production beyond the traditional farm setting, in the form of tropical storms and hurricanes. Eastern conditions associated with these events can result in severe damage to oyster farms. Damages related to wind, storm surge, and decreased salinity due to flooding include oyster mortality, loss of gear and equipment, and increased labor costs.

Florida Department of Agriculture and Consumer Services

Best Management Practices for the East Coast Shellfish Aquaculture Industry

INTRODUCTION

The Gulf of Mexico region has a long history of oysters that have dominated many recent conversations. The official hurricane season is from June 1 through November 30. As the season progresses, the threat of major hurricanes increases from west to east across the region. As such, Texas and Louisiana are the prime targets for early season hurricanes, while the west coast of Florida is most likely to be impacted in mid-September to October. According to the National Oceanic and Atmospheric Administration (NOAA) National Hurricane Center, the best opposing season for the Gulf of Mexico is from June 1 through November 30. As the season progresses, the threat of major hurricanes increases from west to east across the region. As such, Texas and Louisiana are the prime targets for early season hurricanes, while the west coast of Florida is most likely to be impacted in mid-September to October. According to the National Oceanic and Atmospheric Administration (NOAA) National Hurricane Center, the best opposing season for the Gulf of Mexico is from June 1 through November 30.

USDA United States Department of Agriculture
 National Institute of Food and Agriculture
 AQUACULTURE CENTER
 NOAA

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Best Management Practices (BMPs)

- ❖ **Positive Public Perception and NIMBYism**
 - Adopt and follow a good neighbor policy
 - Encourage traditional uses of the water
 - Educate public on the benefits of shellfish aquaculture
 - Get involved in community action programs



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Best Management Practices (BMPs)

❖ Good Neighbor Policy

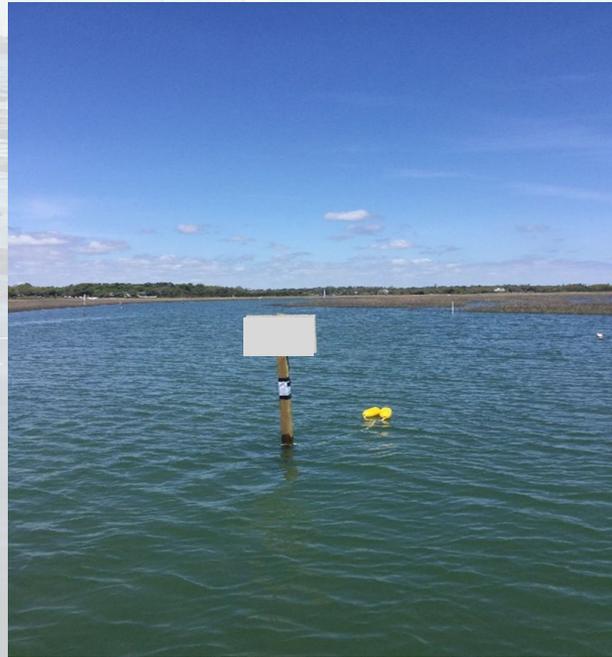


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Best Management Practices (BMPs)

❖ Good Neighbor Policy

- Markings



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Best Management Practices (BMPs)

❖ Good Neighbor Policy

- Markings
- Noise

NOISE

Owners, Visitors and Tenants

- Please be considerate of others.
- **EXCESSIVE NOISE is PROHIBITED AT ALL TIMES**
- Noise levels must be at minimum levels after 10:00PM at night.
- Use headsets for music and movies after 10:00PM



Shhhhh!

USING COMMON COURTESY... makes for happy neighboring

Aquaculture Gear Management Techniques

Best Management Practices (BMPs)

❖ Good Neighbor Policy

- Markings
- Noise
- Odors



Aquaculture Gear Management Techniques

Best Management Practices (BMPs)

❖ Good Neighbor Policy

- Markings
- Noise
- Odors
- Upland storage areas

THE GOOD NEIGHBOR POLICY EXPLAINED



PLEASE

**HELP KEEP
HIS RESTROOM
CLEAN**



NOISE

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Best Management Practices (BMPs)

❖ Record Keeping

- Detailed records
- Observations, measurements, and counts
- Technology and regulatory changes



E280

Bulletin

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Record Keeping for Shellfish Aquaculture

Gef Flimlin, Ocean County Marine Extension Agent

Date	Tide	Rain (In.)	Back River		Pond 1E	
			Salinity (ppt)	Temp. (°C)	Salinity (ppt)	Temp. (°C)
February 23, 2017	Mid	0.0	24.7	16.6	24.7	17.9
February 24, 2017	Mid	0.0	25.3	16.9	24.6	18.4
February 25, 2017	High	0.0	25.5	17.9	25.0	19.6
February 26, 2017	High	0.0	25.9	17.1	25.3	17.5
February 27, 2017	High	0.0	26.3	16.9	25.4	17.1
February 28, 2017	High	0.0	25.8	17.8	25.4	19.2
March 1, 2017	Mid	0.0	24.7	18.4	25.4	20.1
March 2, 2017	Mid	0.1	24.5	19.3	25.1	20.8
March 3, 2017	Low	0.0	24.9	16.2	25.4	17.5
March 4, 2017	Low	0.0	25.1	15.2	25.5	16.2
March 5, 2017	Low	0.0	25.3	14.8	25.7	16.1
March 6, 2017	Low	0.0	25.5	14.9	25.8	16.7
March 7, 2017	Mid	0.0	25.6	15.1	25.8	16.8
March 8, 2017	Mid	0.0	25.6	17.8	25.9	18.8
March 9, 2017	Mid	0.0	25.4	16.6	25.9	18.6
March 10, 2017	High	0.0	25.9	17.1	25.9	18.6
March 11, 2017	High	0.0	26.6	16.6	26.0	17.5
March 12, 2017	High	0.0	27.4	16.4	26.1	17.3
March 13, 2017	High	0.0	27.4	14.9	26.2	14.3
March 14, 2017	High	0.5	27.0	13.8	26.1	13.2
March 15, 2017	Mid	0.0	26.6	12.3	26.1	10.6
March 16, 2017	Mid	0.0	27.0	10.4	26.3	9.9
March 17, 2017	Mid	0.0	27.1	11.0	26.4	10.8

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Best Management Practices (BMPs)

❖ Farm Level BMP's

- Consider farm site, gear type, and culture methods
- Create BMP guide for organizing work and record keeping
- Update BMP with changes to activities



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Poll Question

What method have you used to prepare your shellfish lease for storm impacts?

- a) Sinking cages/removing floats from bags
- b) Increasing oysters per bag bringing gear below surface off bottom
- c) Reducing oysters per bag reducing weight of gear
- d) Inspecting and replacing parts of the gear
- e) Attaching additional anchor points

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NC Aquaculture Development Conference 2021

❖ Key Takeaways

- Choose site before choosing gear
- Prep farm for storms rather than moving gear/product off site
- Capacity to prep farm before a storm (i.e., farm size)
- Always overspend on big anchors - Bigger the better!
- Oversize lines and learn your knots
- Protect your vessel for mobility after storm
- Permanent gear tags are well worth the investment

Questions?

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Shellfish Lease and Aquaculture Program

<http://portal.ncdenr.org/web/mf/habitat/enhancement/shellfish-leases>

Shellfish Aquaculture Tool

<https://arcg.is/0LD5zS>